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# UM researcher provides tool to conserve caribou habitat

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NEWS RELEASE

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**UM RESEARCHER PROVIDES TOOLS TO CONSERVE CARIBOU HABITAT**

**MISSOULA –**

The northern spotted owl has long been a creature of controversy in the United States – relished by conservationists and reviled by conservatives.

Now University of Montana researcher Mark Hebblewhite said the woodland caribou may be filling a similar niche in Canada.

A wildlife researcher and assistant professor at UM's College of Forestry and Conservation, Hebblewhite has focused his studies for the past 15 years on wild ungulate herbivores and their relationship with their primary natural predators – wolves – across Canada, the United States, Eastern Europe and Mongolia.

"Caribou are a weird ungulate, a strange ungulate," said Hebblewhite.

Other ungulates, such as elk, deer and moose, he explains, relish "young" habitat – the type that features rapid growth of new shrubs, forbs, grasses and other forage that typically thrive in open country. It's the sort of habitat that might be produced by natural causes such as fire or by the large-scale timber-harvesting practices of man.

Woodland caribou, on the other hand, seek out "old" habitat, Hebblewhite said.

"They eat lichens to survive the winter," he said. "And lichens depend on old forests. Woodland caribou are like the biggest, ugliest spotted owl you can think of. They need huge

chunks of old, boreal forests, over a huge area."

Caribou require large areas of old-growth forest as winter range, adds Hebblewhite, because when portions of forest are destroyed periodically by fire, they can easily move into a similar sanctuary nearby.

Recent timber-harvest practices in Canada and the U.S. have wiped out vast expanses of forest across the woodland caribou's range, Hebblewhite said.

"What we've done is taken these big chunks of winter range that moose and wolves don't come into, and converted them to young forests that wolves, elk and moose love," he said.

Caribou evolved a strategy to avoid wolves in boreal forests, and now, Hebblewhite said, they're "bumping into" the predators more and more frequently. The result is an alarming decline in caribou populations.

"They're endangered in the U.S. (found only in northern Idaho and Washington) and threatened in Canada," Hebblewhite said. "A third to half of Canadian populations are declining because of human causes. Wolves are the proximate cause of caribou decline. But the ultimate cause is this land change."

Conservation of woodland caribou – which are distinct from the barren-ground caribou that inhabit the tundra of northern Canada and Alaska – has become Hebblewhite's main research project.

He is the lead investigator of a massive, four-year, interagency study of the imperiled animals in British Columbia and Alberta, directed by the Canadian government and involving UM and the universities of Calgary and Alberta.

Hebblewhite's analogy of the northern spotted owl is apt.

When they were listed in 1990, spotted owls became one of the most famous symbols of the 1973 Endangered Species Act in the United States. Mandated protection of habitat was deemed critical for the species' survival.

The equivalent Canadian law – the Species At Risk Act – is only five years old. Woodland caribou are now classified as threatened under SARA.

"One of the first animals to come on the list (as endangered) is going to be woodland caribou," said Hebblewhite, because of drastic population declines as a result of human activities – oil and gas development, widespread clear-cut logging practices, urban development and increased recreational intrusions.

Of the 11 populations of caribou that Hebblewhite and his team of UM graduate students study, he said, "three populations could go any day. One population is down from 300 animals to 80 in just the last few years.

"The situation (in Canada) is much like the grizzly bear in the U.S. 20 years ago," he said. "They're trying to turn the population around."

Hebblewhite is a member of a science advisory group appointed by Canada's federal government to help woodland caribou recover. The group is charged with identifying key caribou habitat, which under SARA must be protected, or – as under the ESA – mitigated if that habitat is damaged or destroyed.

"What this whole project is trying to do," said Hebblewhite, "is to help caribou recover by providing a strategy across a broad landscape scale. We've already got tons of development. How do we spatially structure that development to best conserve caribou?"

His research is designed to create the tools for government and industry to accomplish that goal. He believes that integration of science and policy is necessary to save the caribou.

Hebblewhite's research combines old-fashioned fieldwork with the latest advancements in technology.

UM grad students trained and supervised by Hebblewhite perform much of the on-the-ground operations, spending weeks at a time in the backcountry, evaluating habitat, and observing and trapping caribou, as well as wolves. The animals are fitted with collars equipped with radio transmitters that allow the biologists to track their movements through aerial telemetry in planes and helicopters.

The collars also feature Global Positioning System units that provide the exact location of each animal. If the GPS unit suddenly stops functioning or shows no sign of movement, it usually indicates the animal has died. The biologists can then investigate and determine the cause of the fatality.

Wildlife data collected in the field is incorporated with information gathered from satellite images that reveal ongoing changes in caribou habitat caused by various human developments – roads, seismic oil and gas test lines, pipelines and forestry. Displayed graphically on computer-generated maps, the overlaid data creates a valuable new tool known as Geographic Information Systems.

"GIS allows natural resource managers and scientists to understand the real-time consequences of habitat loss and fragmentation to natural systems by keeping track of the spatial information about human development and its impacts on wildlife," Hebblewhite explains. "By combining remote sensing from satellites with GPS collar data in a GIS, we can study the impacts of humans on wildlife and make firm recommendations to natural resource managers and the public. It also allows us to develop specific tools that managers can use to gauge the impact of proposed future developments on wildlife."

Scientists' understanding of the woodland caribou's specialized habitat requirements is coming too late to save all the separate populations across their historic regional range, Hebblewhite said.

"Many herds are now in national parks," he said. "And those populations are doing OK. What we're looking at is this big regional scale, trying to provide guidelines for management and industry to determine where can we save these herds. If we try to save them all, we're going to fail."

Hebblewhite proposes a threefold strategy to protect woodland caribou.

The first priority is to try to determine which herds are located in relatively pristine habitat that could be protected by creation of new parks or other conservation approaches.

The second strategy, said Hebblewhite, is "to determine what herds we have to write off because there's no way to recover them. Once they've passed a certain threshold of development on a particular piece of landscape, we've found we can't keep caribou there anymore."

And his third recommendation – which he maintains is the one of most interest to industry – is to determine which herds, with careful management, can be preserved while allowing development to proceed.

"That," said Hebblewhite, "is the model of sustainable development."
For example, if a company wants to put in a pipeline or timber clear-cut, it must carefully weigh the location to avoid prime caribou habitat.

"They need to know the number of caribou affected," he said. "It comes down to money. So we're building GIS tools to help them determine the effects and costs and benefits to animals."

The value of those tools to companies, according to Hebblewhite, is demonstrated by the primary funding for his caribou research, which is being provided by the Canadian Association of Petroleum Producers, Shell Canada and Weyerhaeuser Canada, as well as Parks Canada.

A native of Canada, Hebblewhite received a master's degree at UM and then came to teach at the University in 2006 after earning his doctorate at the University of Calgary.

Besides the woodland caribou project, Hebblewhite's other current research includes studies of the response of Sierra Nevada bighorn sheep to fire on winter ranges and managing urban elk in seven western U.S. states, including Montana.

He said ungulates and their predators are particularly appropriate subjects of scientific scrutiny.

"Large charismatic megafauna like wolves, elk and caribou are important for three main reasons," he said. "One, is that species like wolves are important ecosystem drivers and perhaps keystone species that help shape entire ecosystems. My research has demonstrated that wolves help restore aspen forests by reducing elk densities.

"Two, they are umbrella species, whose protection requires large areas of protected habitat under which many other species are thought to also be protected.

"And three, they serve as flagship species that attract people's attention, money and conservation efforts to help protect other less charismatic species that might be as attractive for conservation reasons."

All his current research projects reflect a trend toward examination of wildlife issues across an increasingly broader scale of geographic landscapes, or, as Hebblewhite describes it, "the bigger picture."

"It's very important," he said, "that wildlife biologists think about things like climate change, the scale of urban development that's occurring across the West and the energy development that's racing across huge regions.

"It's a difficult problem for wildlife conservationists to say that the results of one study apply across a wide scale or affect different populations. To be effective, wildlife biologists have to look at big issues, like the timber changes around the world. Ungulates are concerned with two things: finding food and avoiding predators. All these changes affect that balance. All of our projects are trying to work at that big landscape scale, even on a continental scale."

In his latest research, Hebblewhite collaborates with scientists around the world to determine the global effect of climate change on wildlife, specifically ungulates such as elk and caribou.

He's excited to be working on the project with UM ecologist and fellow forestry Professor Steve Running, a pioneer in satellite imaging, who shared the 2007 Nobel Peace Prize for his work on climate change.

"It's one of the great things about being here (at UM)," said Hebblewhite, "because he's such a global thinker.

"I think our job as scientists is to help the public understand what's happening," he adds. "Myself and scientists across the world are developing data sets on elk and caribou to see how populations are responding to climate change. We'll try to design a prioritization scheme to help us predict what's happening.

"It's our job to demonstrate if climate change affects wildlife dynamics and to figure out how to protect and restore habitat. It may help people work on solutions."

**By Daryl Gadbow for UM University Relations**

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